Universidade de Aveiro Departamento de Educação e Psicologia
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Perfil dos adultos mais velhos com demência na Europa: resultados do estudo SHARE

Profile of older adults with dementia in Europe: Results from the SHARE study

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Dissertação apresentada à Universidade de Aveiro para cumprimento dos requisitos necessários à obtenção do grau de Mestre em Psicologia da Saúde e Reabilitação Neuropsicológica, realizada sob a orientação científica da Doutora Maria Piedade Brandão, Professora Adjunta da Escola Superior de Saúde da Universidade de Aveiro e coorientação científica da Doutora Margarida Fonseca Cardoso, Professora Auxiliar do Departamento de Estudo de Populações do Instituto de Ciências Biomédicas Abel Salazar da Universidade do Porto e da Doutora Anabela Sousa Pereira, do Departamento de Educação e Psicologia da Universidade de Aveiro.

o júri

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palavras-chave

Demência; SHARE; Adultos mais velhos; Europa; Estado de Saúde; Função Cognitiva; Depressão; Perturbações Neurocognitivas.

resumo

A esperança média de vida está a aumentar devido às melhorias nos cuidados de saúde nas últimas décadas. No entanto, esse facto tem acompanhado o aumento da incidência das demências nas idades avançadas. O presente trabalho tem como objetivos analisar e comparar o perfil da população Europeia com demência auto-relatada e sem demência, assim como estudar algumas variáveis associadas tais como sociodemográficas, de saúde geral, saúde mental, função cognitiva, riscos comportamentais, educação e emprego. Foi utilizada uma amostra de pessoas com idade igual ou superior a 51 anos, retirada de uma base de dados europeia de acesso público no âmbito da sexta e última onda do Projeto SHARE. Após a seleção da amostra, os resultados revelam que dos 45340 inquiridos (40.1% homens), 897 (2%) têm demência. O presente estudo vai de encontro com investigações anteriores, na medida em que, os sujeitos com demência apresentam uma saúde física e mental e uma qualidade de vida inferiores aos sujeitos sem demência. Verificou-se ainda neste estudo que as pessoas com demência em relação às pessoas sem demência: i) reformam-se, em média, 2 anos mais cedo; ii) apresentam níveis mais baixos de educação formal; iii) estão viúvos; iv) apresentam padrões de risco comportamental mais moderado; v) apresentam uma proporção feminina mais elevada principalmente em idades mais avançadas; vi) apresentam défices de função cognitiva que implicam um envelhecimento precoce mínimo de 10 anos. Estes resultados são pertinentes não só para investigações futuras, mas também para prestadores de cuidados a pessoas com demências, pois permitem uma melhor compreensão das variáveis associadas a esta síndrome.

keywords

Dementia; SHARE; Older Adults; Europe; Health Status; Cognitive Function; Depression; Neurocognitive Disorders.

abstract

Life expectancy is increasing due to upgrades in health care in the past decades. However, that lead to an increase of the incidence of dementia in advanced ages. The present work have as objective to analyze and compare the profile of self-reported dementia to without dementia in a European population. We will also study dementia-related sociodemographic, general health, mental health, cognitive function, behavioral risks, education and employment. We used a sample aged 51 or more years that was taken from a European database of public access within SHARE Project sixth and last wave. After sample selection, our results reveal that from 45340 subjects (40.1% males) 897 (2%) have dementia. Our study corroborates published bibliography stating that individuals with dementia have a lower physical and mental health as well as a lower life quality than people without dementia. We also verified that in this study that, when compared to people without dementia, dementia subjects: i) retire on average two years earlier; ii) show lower levels of formal education; iii) more are widowed; iv) exhibit a more moderate pattern of behavioral risks; v) show a higher female proportion, especially for advanced ages; vi) exhibit deficits in cognitive function that implies a premature aging of, at least 10 years. These findings are pertinent not only for future investigations, but also for dementia caregivers because it allows a better understanding of the variables associated with this syndrome.

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Introduction

Worlds' population is living longer and healthier due to improvements in health care in the past decades. However, such has also resulted in an increase of people diagnosed with non-communicable diseases, including dementia (World Health Organization, 2012). Since 2013 dementias, delirium, amnestic disorders and other disorders are classified as Neurocognitive Disorders containing varying degrees of severity (American Psychiatric Association, 2013). Those changes also influenced the age range of this diagnosis that implied a bigger spectrum of ages, involving young people and elders in this category. Still, we decided to analyze dementia cases from wave 6 of "SHARE" database aiming to report recent data findings about this syndrome. The present study agrees with previous investigations, stating that subjects with dementia show deficits of cognitive function. We also found that, in our sample, these cognitive deficits imply a minimum premature aging of 10 years for dementia subjects. Proportions of dementia and some of its relationships concerning cognitive function, depression and employment/retirement are also explored. Our data brings relevant information for future research and for dementia care.

This dissertation is divided in five main sections. While in the first section a state of the art concerning dementia and its categorical changes in DSM was structured to introduce the reader to the subject. Then, in the second and third sections we can find the methods and our statistical analysis results, respectively. In the fourth section results are analyzed and discussed. Finally, in the fifth section the author presents a reflection concerning all the work developed during his dissertation.

State of the art

Neurocognitive Disorders and Dementia

Since 2013, when DSM-5 (*Diagnostic and Statistical Manual of Mental Disorder -5)* was released (American Psychiatric Association, 2013), dementias, were included in Neurocognitive Disorders.

This category covers the group of disorders in which the primary clinical deficit is in cognitive function. Neurocognitive Disorders refers to cognitive deficits that were not present at birth or in early life rather representing a decline from a previously achieved level of functioning. Although cognitive deficits are present in many mental disorders, only those whose central characteristics are cognitive are part of this category (American Psychiatric Association, 2013). Neurocognitive Disorders categories are: delirium, Major ND and mild ND (and its etiological subtypes: Alzheimer's

disease; Vascular, with Lewy bodies, due to Parkinson's disease, frontotemporal, traumatic brain injury, HIV infection, substance/medication induced, Huntington's disease, Prion disease, another medical condition, multiple etiologies and not specified).

"The term dementia is retained in DSM-5 for continuity and may be used in settings where physicians and patients are accustomed to this term. Although dementia is the customary term for disorders like the degenerative dementias that usually affect older adults, the term neurocognitive disorder is widely used and often preferred for conditions affecting younger individuals, such as impairment secondary to traumatic brain injury or HIV infection."

(American Psychiatric Association, 2013, p.591).

In the present study we aim to work with an European dataset known as "SHARE", which does not have in consideration these guidelines from DSM-5 nor have data from subjects under the age of 50 years. Also, data provided about our main variable is a cluster of self-reported diagnosis of "Alzheimer's disease, dementia or senility". Neither in our dataset nor in SHARE services there is any information about this variable specific designation. Therefore, we will classify it as "dementia" because any of those diagnoses involve dementia processes.

Dementia

Dementia is usually a chronic and progressive syndrome caused by a variety of brain conditions that affect memory and one or more higher cognitive functions, such as abstract thinking, orientation, comprehension, calculation, learning, language and judgment (World Health Organization, 2017). It usually does not interfere with consciousness or alertness, although usually involves alteration of emotional control, social behavior or motivation, as well as interference with daily life activities (World Health Organization, 2017). Diagnose of this syndrome is characterized by a multiple cognitive deficit, including memory, and at least one of the following symptoms: aphasia; apraxia; agnosia; executive deficits (Morais, 2009; Caramelli & Barbosa, 2002).

The most common form of dementia is Alzheimer's disease accounting for 60% to 70% of dementia cases (World Health Organization, 2017). Efforts to prevent dementia include attempts to reduce risk factors, such as high blood pressure, smoking, high cholesterol, diabetes and obesity (World Health Organization, 2014; Whitmer, Sidney, Selby, Johnston & Yaffe, 2005). However, more recent findings suggest that there is no relationship between obesity and dementia (Qizilbash et al., 2015). Also, excessive alcohol consumption is related to a higher risk of dementia (Xu et al.,

2017). However, age is the main risk factor in the development of dementia (World Health Organization, 2017; Santana, Farinha, Freitas, Rodrigues & Carvalho, 2015).

The mean age of the onset of dementia is about 80 years and cases of dementia in people under 65 years are considered as 'dementia of early onset (Alzheimer Europe, 2015; Vieira et al., 2013) being usually related to brain injury, alcohol consumption, HIV and frontotemporal degeneration (McMurtray, Clark, Christine & Mendez, 2006). There is a lot of information regarding the prevalence and overall incidence of dementia, as well as associated mortality and overall economic cost. Main information comes from countries with high economic power (high-income) but data for low and middle-income countries (LMIC) has also increased throughout the years (World Health Organization, 2017).

Dementia affects about 47 million people in the world (World Health Organization., 2017; Prince, 2015). Between 5 and 7% of people over 60 years of age have dementia, with higher prevalence in the countries of Latin America (8.5%) and lower in sub-Saharan Africa (2-4%) (Prince, 2013). It is believed to result in economic costs between 604 and 818 billion dollars per year (World Health Organization, 2012; Prince, 2015).

It is expected that the number of people affected with dementia will almost double every 20 years, reaching 74.7 million people by 2030 and 131.5 million by 2050 (Prince, 2015; World Health Organization, 2012). The majority of the estimated increase will occur in developing countries (currently about 58% of people with dementia live in LMIC), estimated to reach 68% in 2050 (Prince, 2015; World Health Organization, 2012). There are more than 9.9 million new cases of dementia every year in the world, translating in a new case every 3.2 seconds (Prince, 2015; Santana, Farinha, Freitas, Rodrigues & Carvalho, 2015). At the European level, the Alzheimer Europe association (Alzheimer Europe, 2013) for 2013 had estimated a 1.55% prevalence of dementia in the European Union (8,702,033 people, of which 2,866,771 men and 5,835,262 women).

Concerning Portugal, Alzheimer Europe association stands out that the number of people living with dementia in 2012 was 182,526, representing about 1.71% of the total population (10,699,333 people), a slightly higher prevalence than the EU average (1.55% in 2013). Nunes and colleagues (2010) reported a prevalence rate of dementia of 2.7% in people aged 55-79 years in northern Portugal and Santana et al. (2015) reported a prevalence of 5.91% (160,287 people) in the population aged 60 years or older (2,713,715) based on estimations. These differences in prevalence rates do not allow us to properly understand dementia proportion in Portugal nor allow us to understand how it changes over time. Also, age differences between samples might explain these variations. Therefore, we consider important to address this issue in our work.

The Survey of Health, Ageing and Retirement in Europe (SHARE)

SHARE is a multidisciplinary and cross-national database of micro data on health, socio-economics and social and family networks. Represents a European Longitudinal Ageing Survey that has become a major pillar for European and worldwide research (Börsch-Supan, 2013). SHARE was founded in 2002 and currently has available six waves of data collection (wave 1 from 2004, wave 2 from 2006/2007, wave 3 from 2008/2009, wave 4 from 2010/2011, wave 5 from 2013 and wave 6 from 2015) available for researchers in the project's website (www.share-project.org).

This survey includes a wide variety of information such as health variables, bio-markers, psychological variables and social support variables as well as social network information (Abduladze, 2013). SHARE was harmonized with the U.S. Health and Retirement Study (HRS) and the English Longitudinal Study of Ageing (ELSA) following rigorous procedural guidelines, electronic tools, and instruments that were designed aiming a harmonized cross-national design (Abduladze, 2013). Therefore, SHARE constitutes itself as an important vehicle not only for European communication but also for international scientific progress.

Some studies that used SHARE have shown interesting results that not only may confirm other (previous) findings but also, give a new and updated comprehension about dementia (and other) phenomena. For example, Adam and colleagues (2013) using wave 1 of SHARE shown that cognitive function has a negative association with age progression and a positive association with years of education (Adam, Bonsang, Grotz & Perelman, 2013). Furthermore, they discovered that most types of occupational activity were associated with cognitive reserve, which appears to mean that work or engagement in other occupational activities may positively influence cognitive performance (Adam, Bonsang, Grotz & Perelman, 2013).

Abu-Rayya (2006) shown that European elders participate less in social activities with increasing age, while younger elders tend to be more socially involved. Moreover, lesser participation in social activities is correlated with greater levels of depression (Abu-Rayya, 2006). It has been consistently shown in other international studies that dementia and depression are correlated (Snowden et al., 2015; Bennett & Thomas, 2014; Gao et al., 2013). Also, Ploubidis and Grundy (2009) shown that there is considerable between-country heterogeneity in mental health in Europe elders, where Spain was the country with highest depression scores and Denmark scored the highest value on well-being variables. They have also shown that optimal mental health was associated with higher education and being married (Ploubidis & Grundy, 2009). Also, Horner (2014) found that individuals facing retirement at the age of 65 or later experience an increase in subjective well-being, roughly equivalent to individuals facing earlier retirement. Finally, researchers found that early

retirement appears to have a significant negative impact on the cognitive ability of people in their early 60s (Rohwedder & Willis, 2010).

Because SHARE has six waves of data, it allows researchers to perform longitudinal studies. Sterniczuk and colleagues (2012) have shown that higher levels of cognitive impairment at baseline were strongly associated with future poor health outcomes and impairment, revealing that subjects with one impaired test at baseline were more likely to die after an average of 40 months, compared to individuals with no impairments. Also, their data revealed that in subjects who had reported the absence of dementia initially, those with two or more cognitive impairments at baseline were more likely to report dementia at a follow-up (Skirbekk, Loichinger & Weber, 2012).

Main Purpose

Our review allowed us to better approach dementia and its related variables, but at the same time some findings are opposite. This generates doubt about some relationships concerning dementia (employment, BMI, depression and others) and how those relationships flow with age progression. There is also a lack of clear information concerning dementia proportion in Portugal. An assessment of these aspects might be relevant for future dementia considerations and researches. In this work, we aim to analyze the profile of European population aged 51 years or more. For that we will use recent data and will estimate the prevalence/proportion of self-reported dementia in a sample from wave 6 of SHARE and measure the associations between dementia and sociodemographic, health, mental health, cognitive function, behavioral risks, education and employment variables compared to subjects without dementia.

Methods

SHARE

In this study we used the most recent wave of SHARE, that includes data from 18 countries (Austria, Belgium, Croatia, Czech Republic, Denmark, Estonia, France, Germany, Greece, Israel, Italy, Luxembourg, Poland, Portugal, Spain, Sweden, Switzerland and Slovenia) with Croatia participation in SHARE for the first time (Börsch-Supan, 2017).

For the present study we used data collected in wave 6, not only aiming to use the most recent available information but also to be able to obtain data from our native country (Portugal) that became part of SHARE project in 2010 (Börsch-Supan, 2017; 2013).

Sample

SHARE is a multidisciplinary panel database of data on health, social and family networks and socio-economic status of approximately 123,000 individuals aged 50 or older. This survey covers 27 European countries and Israel. SHARE interview was developed to cross-link with the US Health and Retirement Study and the English Longitudinal Study of Ageing. Data was collected in interviews conducted by healthcare professionals in the country where respondents were living, with an average interview duration of around 90 minutes. Data used in the present work are freely available to the research community at http://www.share-project.org.

For the analysis, we started with a sample of 46,677 subjects and only excluded data from those who did not answered our main variable. From now on our main variable of interest will be designated as "dementia", as discussed before. Our analysis was conducted using a total sample of 45,340 subjects (1,337 missing) with a percentage of 2.0% of individuals with self-reported dementia (Table 1) where the lowest age is 51 years old. Those were later organized by age groups (≤64; 65-74; 75-84; ≥85) for a deeper analysis.

Table 1 – Sample distribution according to have been told by their Doctor they had: Alzheimer's disease, dementia, senility.

Dementia Report	N	Proportion
Dementia	897	2.0%
No Dementia	44443	98.0%
Total	45340	100.0%

Dependent Variable

Our dependent variable assessed dementia processes and consists in the following sentence "Doctor told you had: Alzheimer's disease, dementia, senility" – Yes or No). Because our sample was composed by older adults and disease information was not specific, this cluster of diagnosis will be referred as dementia. According to DSM-5 guidelines the use of this term should be appropriate for the present work due to the referred conditions.

Independent Variables

Independent variables of this study include those of social-demographic, behavioral risks, health-related questions, cognitive function and mental health.

Socio-demographic variables: age, gender, education level (International Standard Classification of Education – ISCED; UNESCO, 2012), marital status, employment status and years retired.

Behavioral risks variables: smoking, drinking and practice of sports.

Health-related questions: health in general, Quality of Life (measured using Control, Autonomy, Self-Realization, Pleasure – "CASP-19" – questionnaire; Börsch-Supan, Brugiavini, Jürges, Makenbach, Siegrist & Weber, 2005), physical limitations, difficulties, body mass index (BMI), hospitalizations and number of medications.

Cognitive Function variables: short and simple tests of orientation, memory (learning and recall of a list of ten words), verbal fluency (a test of executive functioning) and numeracy (arithmetical calculations). Participants also had to rate their own reading and writing skills providing a chance to understand their insights. Tests of orientation involved four questions concerning time notion (day of the month, month, year and day of the week). Memory task tested the ability of verbal learning and recall where participants were required to learn a list of ten common words; initially respondents were asked to read each word and then immediate (right after encoding phase) and delayed recall (about five minutes after immediate recall) tasks were carried out. Between those two recall tasks, verbal fluency and numeracy questions were assessed. The fluency task required participants to name as many different animals as possible in one minute. Performance was evaluated by the total number of different animal names given by the participant. The numeracy tasks were tested by consecutive subtractions from simple calculations, and performance was rated by correct or incorrect answer. There is also a simple calculation of a percentage in numeracy tasks.

Mental Health variables: re-adaptation of Euro-D (depression scale designed to allow comparisons between countries in Europe). The Euro-D (Prince et al., 1999) involves an evaluation of twelve items (depressive mood, pessimism, death wish, guilt, sleep, interest, irritability, appetite, fatigue, concentration, satisfaction and crying) that were taken from Geriatric Depression Scale (Yesavage et al., 1983). Development and validation of a geriatric depression screening scale: a preliminary report. Journal of psychiatric research, 17(1), 37-49.). Each item is scored with 0 (absence of symptom) or 1 (presence of symptom) and total results can range between 0 and 12.

Statistical Analysis

Data was analyzed using Statistical Package for the Social Sciences, version 24 (IBM, 2016). The sample was divided according to the answers given in our main variable (Yes or No), and then groups were classified as "Dementia" for "Yes" and "Without Dementia" for "No". Then, dementia proportion was estimated for individuals aged ≥50 years through frequency tests. For comparisons between groups, descriptive statistics measures of frequency, central tendency and variation were used to describe our sample groups. Chi-square tests and t tests were used to determine if social-demographic, behavioral risks, health, cognitive function and mental health outcomes were significantly different between both groups. Our statistical analysis data is presented with default confidence limits (CI) at 95%. Variables that might have been influenced by age were deeply explored by age stratification. In all tests, the statistical significance was two-sided and considered significant at $p<0.05$.

Results

Socio-demographic characteristics of those having or not having been told by their Doctor they had Alzheimer's disease, dementia or senility can be found in Table 2. Our results shown that "Dementia" group (N=897) is older (mean = 80.19 years old) than "Without Dementia" group (mean = 68.12 years old). Also, revealed that in both groups the proportion of female gender is higher than the one of males (59.9% in "Without Dementia" group and 66% in "Dementia" group). Furthermore the majority of "Dementia" group marital status is "Widowed" (62.5%) while the majority of "Without Dementia" group marital status is "Married/Registered" (55.9%). Concerning employment status, our data indicate that most individuals in both groups were "Retired" (72.3% for "Dementia" group and 59.9% for "Without Dementia" group). While only 24.1% of "Without Dementia" group were employed, only 2.3% of "Dementia" were in that employment situation.

Table 2: Socio-demographic characteristics of the participants according to have been told by their Doctor they had: Alzheimer's disease, dementia, senility.

	Without dementia N=44443	(98%)	With dementia N=897	(2%)			
					P-Value	Test	DF
Age mean ± SD	68.12	±10.08	80.19	± 10.11	<0.001	T -35.491	45338
Age diagnosed mean ± SD			65.07	± 20.07		F (4.057)	
	n	%	N	%			
Gender					<0.001	Q	
Male	17833	40.1%	305	34.0%		13.763	1
Total	44443	100.0%	897	100.0%			
Marital status					<0.001	Q	
Married/Registered partnership	5599	55.9%	45	25.6%			
Never married	702	7.0%	11	6.3%		121.115	3
Separated/divorced	1125	11.2%	10	5.7%			
Widowed	2593	25.9%	110	62.5%			
Total	10019	100.0%	176	100.0%			
Employment status					<0.001		
Retired	26231	59.9%	554	72.3%			
Employed	10575	24.1%	18	2.3%			
Other	7039	16.0%	194	25.3%			
Permanently sick/disabled	*1330*	*3.0%*	*60*	*7.8%*			
Homemaker	*3603*	*8.2%*	*93*	*12.1%*			
Unemployed	*1221*	*2.8%*	*5*	*0.7%*			
Total	43935	100.0%	766	100.0%			
Years Retired					<0.001	Q	
0	554	1.2%	0	0.0%			
1-5 Years	6974	15.7%	43	4.8%		176.058	5
6-10 Years	5025	11.3%	56	6.2%			
11-15 Years	4515	10.2%	58	6.5%			
16-20 Years	3707	8.3%	85	9.5%			
21+ Years	23668	53.3%	655	73.0%			
Total	44443	100.0%	897	100.0%			
ISCED Levels					<0.001	Q	
None	1858	10.9%	95	33.6%			
1-2	4852	28.3%	108	38.2%		190.822	5
3-4	6136	35.8%	48	17%			
5-6	2887	16.9%	16	5.7%			
7-8	1371	8.0%	15	5.3%			
Other	16	0.1%	1	0.4%			
Total	17120	100.0%	283	100.0%			

SD – Standard Deviation; T – T-Student; Q – Chi Square; DF – Degrees of Freedom

For those who were retired, many individuals from both groups have been retired for 21 years or more (73% in "Dementia" group and 53.3% in "Without Dementia" group). For education levels, in the International Standard Classification of Education (ISCED) "Dementia" group shown lower levels of education than "Without Dementia" group. While 33.6% of "Dementia" group had no formal education or had early childhood education, only 10.9% of "Without Dementia" group falls in this category. According to this levels, "Dementia" group had higher proportion in the three lower categories (from no formal education to lower secondary education) while "Without Dementia" group exhibited a higher proportion in the subsequent groups (from upper secondary education to doctoral level).

Concerning Behavioral Risks, our descriptive analysis (Table 3) revealed that "Dementia" group had a smaller proportion of subjects who smoked daily (17.9%) compared to "Without Dementia" group (46%).

Table 3: Behavioral Risks of the participants according to have been told by their Doctor they had: Alzheimer's disease, dementia, senility.

	Without dementia N=44443	(98%)	With dementia N=897	(2%)			
	N	%	n	%	P-Value	Test	DF
Ever smoked daily					<0.001	Q	
Yes	3382	46.0%	20	17.9%		35.258	1
No	3968	54.0%	92	82.1%			
Total	7350	100.0%	112	100.0%			
Smoke at the present time					0.659	Q	
Yes	1712	50.6%	9	45.0%		0.25	1
No	1671	49.4%	11	55.0%			
Total	3383	100.0%	20	100.0%			
Sports or activities that are vigorous					<0.001	Q	
More than once a week	14574	32.8%	71	7.90%		573.848	3
Once a week	6181	13.9%	33	3.7%			
One to three times a month	4265	9.6%	42	4.7%			
Hardly ever, or never	19409	43.7%	750	83.7%			
Total	44429	100.0%	896	100.0%			
At least one alcoholic beverage the last 7 days					<0.001	Q	
Yes	23101	52.0%	216	24.1%		273.371	1
No	21332	48.0%	680	75.9%			
Total	44433	100.0%	896	100.0%			
How often 6 or more drinks the last 3 months					<0.001	Q	
Daily or almost daily	779	1.8%	12	1.3%		84.595	3
Weekly or almost weekly	2030	4.6%	15	1.7%			
Monthly or almost monthly	5727	12.9%	38	4.2%			
Not at all in the last 3 months	35879	80.8%	832	92.8%			
Total	44415	100.0%	897	100.0%			

Q – Chi Square; DF – Degrees of Freedom

For subjects who "ever smoked daily" (answer "Yes") these differences are diminished when we analyzed smoking habits of those who smoke at present time, revealing an approximation between "Dementia" group (45%) and "Without Dementia" group (50.6%). Considering alcohol consumption habits, data followed a similar trajectory to smoking habits with 24% of "Dementia" group having ingested alcohol 7 days prior to the interview, compared to 52% of "Without Dementia" group. When asked about having 6 or more drinks in 3 months prior to the interview, the majority of both "Dementia" (92.8%) and "Without Dementia" (80.8%) groups did not exhibited such behavior. Data also revealed that a big part of "Dementia" group (83.7%) "Hardly ever, or never" practice sports, with a percentage 40% higher than the one of the "Without Dementia" group (43.7%).

Regarding General Health, our descriptive analysis (Table 4) indicated that "Dementia" group (44.2%) had a bigger proportion of subjects who rate their heath as "Poor" when compared to "Without Dementia" group (10.3%). Also, "Dementia" group (87.4%) had a bigger proportion of subjects who have 2 or more chronic diseases when compared to "Without Dementia" group (49.6%) with "Dementia" group (mean = 3.87) having a higher mean of chronic diseases than "Without Dementia" group (m = 1.81). Similarly, "Dementia" group (57.2%) had a bigger proportion of subjects who have 1 or more limitations in daily life activities when compared to "Without Dementia" group (11.5%), whereas more than half of individuals assigned to "Dementia" group (55.4%) considered to be severely limited in activities because of their health status when compared to "Without Dementia" group (14.8%).

The majority of both "Dementia" (61.5%) and "Without Dementia" (98.6%) groups did not have difficulties taking medications. Even thought, about one third of "Dementia" group shown difficulties taking medications. "Dementia" group also had a bigger proportion (59.3%) of subjects that take 5 or more drugs per day compared to "Without Dementia" group (28.%). Both "Dementia" (33.6%, 18%) and "Without Dementia" (40.9%, 22.7%) groups had a Body Mass Index (BMI) considered overweight or obese, respectively. Furthermore, both groups had a majority of subjects that were over the normal BMI score. "Dementia" group (mean = 25.96) had a lower mean BMI score than "Without Dementia" group (mean = 27.02). Most of subjects of both "Dementia" (74.5%) and "Without Dementia" (84.7%) groups had not stayed overnight in the hospital in the 12 months prior to the interview.

Table 4: Participants health according to have been told by their Doctor they had: Alzheimer's disease, dementia, senility.

	Without dementia		With dementia				
	N=44443	(98%)	N=897	(2%)	P-Value	Test	DF
Health in general					<0.001	Q	
Excellent	3151	7.1%	6	0.7%		1210.448	4
Very good	7865	17.7%	27	3.0%			
Good	15850	35.7%	133	14.9%			
Fair	12991	29.2%	333	37.2%			
Poor	4571	10.3%	396	44.2%			
Total	44428	100.0%	895	100.0%			
2+ chronic diseases					<0.001	Q	
Less than 2 diseases	22404	50.4%	113	12.6%		502.896	1
2+ chronic diseases	22039	49.6%	784	87.4%			
Total	39032	100.0%	6308	100.0%			
1 + limitations with activities of daily living					<0.001	Q	
No adl limitations	39332	88.5%	384	42.8%		1693.45	1
1 + adl limitations	5100	11.5%	513	57.2%			
Total	44432	100.0%	897	100.0%			
Limited in activities because of health					<0.001	Q	
Severely limited	6576	14.8%	496	55.4%		1226.734	2
Limited, but not severely	14044	31.6%	300	33.5%			
Not limited	23813	53.6%	100	11.2%			
Total	44433	100.0%	896	100.0%			
Difficulties: taking medications					<0.001	Q	
Yes	602	1.4%	345	38.5%		5918.495	1
No	43830	98.6%	552	61.5%			
Total	44432	100.0%	897	100.0%			
BMI categories					<0.001	Q	
Below 18.5 - underweight	524	1.2%	36	4.4%		101.573	3
18.5-24.9 - normal	15246	35.1%	356	44.0%			
25-29.9 - overweight	17764	40.9%	272	33.6%			
30 and above - obese	9860	22.7%	146	18.0%			
Total	43394	100.0%	810	100.0%			
Stayed overnight in hospital last 12 months					<0.001	Q	
Yes	6810	15.3%	228	25.5%		69.069	1
No	37601	84.7%	666	74.5%			
Total	44411	100.0%	894	100.0%			
At least taking 5 different drugs a typical day					<0.001	Q	
Yes	9754	28.3%	499	59.3%		382.487	1
No	24715	71.7%	343	40.7%			
Total	34469	100.0%	842	100.0%			
	Mean	**± SD**	**Mean**	**± SD**			
CASP index for quality of life and well-being	36.94 (N=42807)	± 6.383	31.24 (N=534)	± 6.997	<0.001	T (20.472) F(9.653)	4.3339
Number of chronic diseases	1.81 (N=44443)	± 1.601	3.87 (N=897)	± 2.131	<0.001	T (-37.79) F(157.823)	45338
BMI	27.02 (N=43394)	± 4.679	25.96 (N=810)	± 4.915	<0.001	T (6.432) F(2.447)	44202

SD – Standard Deviation; T – T-Student; Q – Chi Square; DF – Degrees of Freedom

As seen on Table 5, Cognitive Function evaluation shown that a big portion of "Without Dementia" group (87.9%) had "Good" Orientation while "Dementia" group (42.9%) had less than half of that portion. Numeracy test of percentage calculation shown that "Dementia" group (37.1%) had almost 8 times more subjects with a "Bad" score than "Without Dementia" group (4.7%).

For subtraction test, "Dementia" group (23.9%) still revealed a poorer performance than "Without Dementia" group (5%), with only a half (31.5%) of individuals were compared to "Without Dementia" group (62.2%) exhibiting a "Good" score.

Concerning "Self-rated Reading Skills", "Without Dementia" group (87.1%) had a bigger portion of their members rating their skills between "Good" and "Excellent" while "Dementia" group (80.3%) had a bigger portion of their members rating their skills between "Poor" and "Good". Similar results were found when analyzing "Self-rated Reading Skills" with "Without Dementia" group (83.4%) having a bigger portion of their members rating their skills between "Good" and "Excellent", while "Dementia" group (83.2%) had a bigger portion of their members rating their skills between "Poor" and "Good".

Regarding memory evaluation immediate and delayed recall tests were performed, revealing that "Dementia" group ($mean_{(immediate)} = 3.11$; $mean_{(delayed)} = 1.58$) had a poorer recall performance in memory tests (immediate recall and delayed recall, respectively) than "Without Dementia" group ($mean_{(immediate)} = 5.32$; $mean_{(delayed)} = 4$) with a mean difference of -2.21 words for immediate recall and -2.42 words for delayed recall. "Dementia" group (mean = 12.23) also had a poorer performance in verbal fluency test, with a mean difference of -7.78 nominations comparing to the "Without Dementia" group (mean = 20.01).

Because age is a risk factor for development of dementia we considered important to arrange our sample per age groups to explore additional data. We decided that this reorganization should be done according to the standard division used in European Statistics (Eurostat) and in Instituto Nacional de Estatística (INE – Statistics National Institute) to allow our data to be easily analyzed and compared for other researchers.

Firstly, we decided to analyze dementia proportions sorted by age, as seen on Table 6. The progression of this proportion revealed that from "≤64" group to "65 to 74" group the proportion of dementia increased 2.04 times (from 0.46% to 0.94%). From "65 to 74" group to "75-84" group this proportion increased 3.69 times (from 0.94% to 3.47%) and, finally, from "75-84" group to "≥85" group this proportion increased 2.98 times (from 3.47% to 10.35). This means that "≥85" group had 22.5 times more proportion of dementia than the "≤64" group. Also, Table 7 allowed us to see gender proportion distribution according to age range, revealing differences with age progression.

Table 5: Cognitive Function scores of the participants according to have been told by their Doctor they had: Alzheimer's disease, dementia, senility.

	Without dementia N=44443	(98%)	With dementia N=897	(2%)			
	n	%	n	%	P-Value	Test	DF
Orientation					<0.001	Q	
Bad	134	0.3%	84	14.3%		4008.087	4
1	219	0.5%	67	11.4%			
2	731	1.7%	79	13.5%			
3	4248	9.7%	105	17.9%			
Good	3856	87.9%	252	42.9%			
Total	43898	100.0%	587	100.0%			
Memory							
Ten words list learning first trial total							
mean ± SD	5.32	± 1.811	3.11	±2.088	<0.001	T (29.102)	44240
N	43663		579			F(49.135)	
Ten words list learning delayed recall total							
mean ± SD	4	± 2.21	1.58	±1.902	<0.001	T (26.183)	44265
N	43689		578			F(6.511)	
Verbal Fluency					<0.001	T (23.582)	44296
mean ± SD	20.01	±7.89	12.23	±6.961		F(7.372)	
N							
Numeracy - percentage calculation							
Bad	338	4.7%	26	37.1%	<0.001	Q	
2	1115	15.4%	19	27.1%		170.553	4
3	2629	36.4%	13	81.6%			
4	2367	32.7%	11	15.7%			
Good	779	10.8%	1	1.4%			
Total	7228	100.0%	70	100.0%			
Numeracy - subtraction calculation							
Bad	2209	5.0%	140	23.9%	<0.001	Q	
1	2110	4.8%	61	10.4%		546.766	5
2	1751	4.0%	48	8.2%			
3	3979	9.1%	73	12.4%			
4	6566	15.0%	80	13.6%			
Good	27292	62.2%	185	31.5%			
Total	43907	100.0%	587	100.0%			
Self-rated Reading Skills							
Excellent	2257	31.1%	7	9.9%	<0.001	Q	4
Very Good	2001	27.6%	7	9.9%		113.751	
Good	2058	28.4%	20	28.2%			
Fair	663	9.1%	21	29.6%			
Poor	269	3.7%	16	22.5%			
Total	7248	100.0%	71	100.0%			
Self-rated Writing Skills							
Excellent	2003	27.6%	8	11.3%	<0.001	Q	4
Very Good	1907	26.3%	4	5.6%		110.142	
Good	2141	29.5%	18	25.4%			
Fair	856	11.8%	22	31.0%			
Poor	340	4.7%	19	26.8%			
Total	7247	100.0%	71	100.0%			

SD – Standard Deviation; T – T-Student; Q – Chi Square; DF – Degrees of Freedom

Table 6: Proportion of Dementia by age.

Age (years)	N with Dementia (n= 897)	Total N (n= 45340)	Percentage of Sample with Dementia (95% CI)
≤64	84 (9.4%)	18074	0.46% (0.37, 0.57)
65 to 74	134 (14.9%)	14292	0.94% (0.79, 1.12)
75 to 84	335 (37.3%)	9651	3.47% (3.12, 3.86)
≥85	344 (38.4%)	3323	10.35% (9.35, 11.45)

CI – Confidence Interval

Table 7 revealed that dementia proportion by gender was not stable with age progression, at least for older ages. On age range "≤64" and "65-74" male and female groups only differed 0.1% between them (0.5%, 1.0% and 0.4%, 0.9% respectively) with male group having a slight higher proportion of dementia. On "75-84" and "≥85" age ranges this trend inverted and female group begun to have a higher proportion of dementia (3.7% and 11.5% respectively) when compared to male group (3.2 and 8.1% respectively). Furthermore, this difference was accentuated by age progression. For both male and female groups, the proportion of dementia increased with age.

Table 7: Dementia proportion by Gender and Age.

	≤64	N	65-74	N	75-84	N	≥85	N
Male	0.5 %	36	1.0 %	57	3.2 %	118	8.1%	94
Female	0.4 %	48	0.9 %	77	3.7 %	217	11.5 %	250

Moreover, Table 8 shown how "Dementia" proportion was distributed across all participating countries, with Switzerland having the lowest proportion (0.7%) and Spain the highest (4.4%).

Table 8: Prevalence of dementia per country and participants that have been told by their Doctor they had: Alzheimer's disease, dementia, senility.

	Without dementia		With dementia		Total
	N=44443	(98%)	N=897	(2%)	100%
	n	%	n	%	
Switzerland	1973	99.3%	13	0.7%	1986
Germany	2847	99%	28	1%	2875
France	2690	98.9%	31	1.1%	2721
Denmark	2533	98.9%	28	1.1%	2561
Croatia	1535	98.6%	22	1.4%	1557
Sweden	2676	98.5%	41	1.5%	2717
Estonia	3748	98.5%	58	1.5%	3806
Belgium	4100	98.4%	65	1.6%	4165
Greece	3121	98.4%	51	1.6%	3172
Italy	3230	98.3%	57	1.7%	3287
Czech Republic	3159	98.3%	55	1.7%	3214
Slovenia	2795	97.6%	68	2.4%	2863
Luxembourg	1137	97.4%	30	2.6%	1167
Poland	1126	97.4%	30	2.6%	1156
Portugal	967	97.1%	29	2.9%	996
Austria	2243	96.3%	86	3.7%	2329
Israel	1270	95.9%	54	4.1%	1324
Spain	3293	95.6%	151	4.4%	3444
Total	44443	100.0%	897	100.0%	45340

Finally, Table 9 provided data from several health-related variables that were sorted by age groups. The first section of the table also allowed us to understand the progression of the proportion in some variables, revealing that the proportion of female members in both groups was always bigger than the male members across all age ranges. It also shown that in both "Dementia" and "Without Dementia" groups, the correlation between female proportion and age progression is positive.

Particularly in "Dementia" group where male subjects proportion decreased from 42.9% in "≤64" age range (*vs* 40.5 for "Without Dementia" group) to 27.3% in "≥85" age range (*vs* 35.7 for "Without Dementia" group) revealing that age progression with dementia affects gender proportions differently.

Table 9 also showed that proportion of subjects that take 5 or more drugs per day increases with age for both "Without Dementia" (from 19% to 43.2%) and "Dementia" (from 45.2% to 59.9%) groups, with the last showing a smaller impact of age progression. In "Dementia" group it seems that from the "75-84" age range to "≥85" the proportion of subjects taking 5 or more drugs per day stabilized or even decreased (from 64.1% to 59.9%).

Our analysis revealed that the proportion of subjects with 1 or more Limitations in Activities of Daily Life (LADL) increased with age for both "Dementia" and "Without Dementia" groups. Although both groups had that in common, "Dementia" group had a higher proportion across all age ranges (from 58.3% to 91.9%) revealing that the lowest proportion in "Dementia" group was higher than the highest proportion in "Without Dementia" group (from 9.1% to 56.5%).

Table 9: Health-related variables by age

	Group	Age			
		≤64 (n=18074) N Proportion (%)	65-74 (n=14292) N Proportion (%)	75-84 (n=9651) N Proportion (%)	≥85 (n=3323) N Proportion (%)
Gender	Dementia	36 (42.9%)	57 (42.5%)	118 (35.2%)	94 (27.3%)
Male	No Dementia	7285 (40.5%)	5892 (41.6%)	3593 (38.6%)	1063 (35.7%)
Take ≥5 drugs	Dementia	33 (45.2%)	66 (53.2%)	209 (64.1%)	191 (59.9%)
per day	No Dementia	2211 (19.0%)	3085 (26.7%)	3259 (38.4%)	1199 (43.2%)
LADL ≥1	Dementia	49 (58.3%)	75 (56.0%)	268 (80.0%)	316 (91.9%)
	No Dementia	1630 (9.1%)	1971 (13.9%)	2837(30.5%)	1681 (56.5%)
Depression	Dementia	53 (69.7%)	71 (61.7%)	147 (64.8%)	100 (66.2%)
	No Dementia	4585 (25.8%)	3574 (25.6%)	3087 (34.0%)	1185 (42.8%)
		Mean ± SD	**Mean ± SD**	**Mean ± SD**	**Mean ± SD**
BMI (kg/m^2)	Dementia	27.85* ± 5.17	27.50* ± 5.46	26.23* ± 4.95	24.51 ± 4.10
	No Dementia	26.97* ± 4.81	27.45* ± 4.69	26.92* ± 4.46	25.55 ± 4.13
CASP	Dementia	31.55 ± 6.99	32.38 ± 6.76	30.94 ± 6.80	30.67 ± 7.40
	No Dementia	37.71 ± 6.08	37.44 ± 6.24	35.51 ± 6.57	33.95 ± 6.77
No. Chronic	Dementia	4.07 ± 2.45	4.04 ± 2.22	3.95 ± 2.18	3.67 ± 1.96
Diseases	No Dementia	1.34 ± 1.41	1.89 ± 1.57	2.39 ± 1.68	2.43 ± 1.73
Ten words list	Dementia	4.57 ± 1.91	3.78 ± 2.01	2.95 ± 2.0	2.14 ± 1.79
first trial	No Dementia	5.95 ± 1.62	5.39 ± 1.64	4.51 ± 1.76	3.59 ± 1.80
Ten words list	Dementia	3.2 ± 1.97	1.95 ± 1.92	1.45 ± 1.78	0.74 ± 1.46
delayed recall	No Dementia	4.75 ± 2.05	4.06 ± 2.08	3.03 ± 2.07	2.07 ± 1.86
Verbal	Dementia	17.28 ± 6.86	13.99 ± 6.71	11.58 ± 6.89	9.47 ± 5.58
Fluency	No Dementia	22.11 ± 7.80	20.31 ± 7.53	17.18 ± 7.26	14.36 ± 6.58
Years Retired	Dementia	7.92 ± 8.71	11.85 ± 6.62	20.34 ± 6.82	28.62 ± 6.89
	No Dementia	5.02 ± 5.28	9.4 ± 6.09	18.73 ± 6.50	27.14 ± 6.71

SD – Standard Deviation; T – T-Student; Q – Chi Square; DF – Degrees of Freedom
* No significant differences were found

While from "≤64" to "65-74" age range, proportion increased for "Without Dementia" (from 9.1% to 1.9%) group, it decreased in "Dementia" group within the same age ranges (from 58.3% to 56%).

Moreover, it has shown that depression proportions in “Without Dementia” group had an increased as age goes by (from 25.8% to 42.8%), but it was more stable in “Dementia” group (from 69.7% to 66.2%) with its highest value in the youngest age range. Although “Dementia” group seem to have more stable depression proportions across all ages its lowest value was higher than the highest value in “Without Dementia” group.

The second section of Table 9 approached mean BMI data showing that both “Dementia” (from an average of 27.85 to 24.51) and “Without Dementia” groups (from an average of 26.97 to 25.55) demonstrated a decrease in BMI as age goes by. “Dementia” group might had a slightly pronounced decrease of BMI as age increases but results between both groups are even. Only for the last age range of BMI evaluation differences between groups were significant. The Quality of Life (QoL) index is a Control, Autonomy, Self-Realization, Pleasure (CASP) scale. The results of this scale shown that both “Dementia” (from an average of 31.55 to 30.67) and “Without Dementia” groups (from an average of 37.71 to 33.95) demonstrated a decrease in CASP score as age goes by. “Without Dementia” group had a slightly higher decrease of QoL as age increases. Although “Dementia” group seemed to had a more stable QoL, its highest score in “Dementia” group is lower than the lowest score in “Without Dementia” group being always under 35 (low QoL). Scores for “Without Dementia” group indicated high (37-39) and moderate (35-37) QoL.

The mean number of chronic diseases increased with age in “Without Dementia” group (from 1.34 to 2.43), while it seemed to stabilized or even decreased in “Dementia” group (from 4.07 to 3.67).

In all Cognitive Function variables assessed (immediate recall, delayed recall and verbal fluency) “Dementia” group show lower scores than the “Without Dementia” group. For immediate recall both “Dementia” (from an average of 4.57 to 2.14) and “Without Dementia” (≤64 – 5.95; 65-74 – 5.39; 75-84 – 4.51; ≥85 – 3.59) groups had shown a loss of capacity of recall as age increased. For delayed recall both “Dementia” (average from 3.2 to 0.74) and “Without Dementia” (average from 4.75 to 2.07) groups had also shown a loss of capacity of recall as age increased. Verbal Fluency scores had a similar progression over age range where “Dementia” group shown again lower scores (average of 17.28 to 9.47) than the “Without Dementia” group (average of 22.11 to 14.36).

Interestingly, in all Cognitive Function variables, the results of age range “≤64” of “Dementia” group were very close to the ones of the age range “75-84” of “Without Dementia” group. Even with sample sorted by age it seemed that “Dementia” group subjects (from 7.92 to 28.62 years) had retired slightly earlier than “Without Dementia” group subjects (from 5.02 to 27.14), resulting in a mean difference of about 2 years (Table 9).

Discussion

Prevalence/Proportion of Dementia

This study determined an overall proportion for dementia subjects of 2%, based on self-reported information given by the subjects at the time of the interview. According to published data, the Alzheimer Europe Association rated the prevalence of individuals with dementia in 2013 at 1.55%, Europe wide (Alzheimer Europe, 2013). On the other side, Prince and his co-workers (2013) quantified the prevalence of European individuals with dementia at 6.99% for Western Europe and around 5.70% for Central and Eastern Europe. However, while the first study took in consideration an age range from 30 years up, the second consisted on metaanalysis performed with raw data from previously studies collected until the year 2000 and only considering individuals with 60 years or more. Thus, incongruences at the level of the age range analyzed between previous bibliography and our data may take the fault for the significant differences found in proportion of European individuals living with dementia.

Furthermore, our results revealed that in our sample the proportion of individuals with dementia in Portugal is equal to 2.9%. Previously, Nunes and colleagues (2010) shown that the prevalence of dementia in North Portugal was 2.7% (sample age between 55-79 years), being an outcome close to ours. On the other hand, some studies had different findings, like Santana et al. (2015) that stated the percentage of prevalence at 5.91% for Portuguese individuals, more than 3% higher of our findings and the ones of Alzheimer Europe, 1.71% (Alzheimer Europe, 2013). While similarities between our study and the one of Nunes and her co-workers (Nunes, Silva, Cruz, Roriz, Pais & Silva, 2010) might indicate a more solid proportion of individuals with Dementia in Portugal, Santana et al. (2015) relied in on previous findings for the EURO-A zone that were extrapolated to the Portuguese population not thus considering true data, but an estimation. Also, Alzheimer Europe (2015) states that dementia is considered of "young onset" when this syndrome starts to disturb people lives before the age of 65 years (also see Vieira et al., 2013), estimating that it constitutes 5% of dementia cases. Our results reveal a higher proportion with young onset cases constituting 9.4% of dementia cases in our sample.

In our study, the proportion of female members was higher for both groups. Also, the proportion of females with dementia is higher across all age groups, especially for those aged ≥85 years. When we analyzed dementia by gender the results revealed that in ≤64 and 65-74 age ranges male subjects had a slightly higher prevalence of dementia than females. For all the subsequent age ranges this trend inverted completely and female subjects begun to have a higher proportion of dementia, with differences rising with age progression when compared to male subjects. Such trend

is partially corroborated by Prince et al. (2013) where the difference in dementia prevalence between man and women not only increase with age, but also is generally higher in the female group across all ages.

Socio-Demographic Variables

Our sample revealed that the majority of subjects with dementia were widowed, which may result in a lower cognitive stimulation, also studies indicate that being married has been reported to be related with optimal mental health (Ploubidis & Grundy, 2009). Additionally, our results revealed that the proportion of individuals with dementia that were employed was 10 times lower than the one of those who did not had dementia. These results are consistent with previous findings (Kröger, Andel, Lindsay, Benounissa, Verreault & Laurin, 2008; Bosma, van Boxtel, Ponds, Houx, Burdorf & Jolles, 2003) that shown that employment might be protective against the development of dementia. In this matter, our analysis of age-grouped sample revealed that subjects with dementia retire on average 2 years earlier than those without dementia, for all age ranges, which reinforce the notion that employment might be protective against dementia and early retirement might have a negative impact on cognitive functions (Rohwedder & Willis, 2010). According to Alzheimer Europe, those individuals with dementia that are still employed are usually cases of "young onset" (Alzheimer Europe, 2015; Vieira et al., 2013).

Also, consistent with previous research (Adam, Bonsang, Grotz & Perelman, 2013), our sample revealed that people with dementia have lower education levels. Higher levels of education seem to be protective for dementia because of cognitive reserve, as it have been shown by several studies (Lamotte et al., 2016; Dekhtyar, et al., 2015; Laks, 2015; Ploubidis & Grundy, 2009).

Health-Related Variables

Concerning behavioral risks, only a few subjects with dementia responded for questions related to smoking habits. Therefore, any assumptions with this regard should be done with caution. Nevertheless, subjects with dementia appear to have more reserve concerning daily smoking habits than those without dementia, although smoking had been related with dementia (World Health Organization, 2012, 2014). Moreover, people with dementia revealed to have a more reserve alcohol intake, although excessive alcohol has been related with dementia in other studies (Xu et al., 2017). As expected, subjects with dementia also have lower habits of sports practice (Ravaglia et al., 2008; Barnes, Whitmer & Yaffe, 2007).

From a general point of view, differences related with BMI were noted between both groups for the last age range. Likewise, individuals with dementia revealed to have a poorer health and a higher number of chronic diseases, limitations in daily activities, difficulties associated with medication intake, proportion of ≥5 pills intake and hospitalizations. Our data for BMI might be consistent with recent findings (Qizilbash et al., 2015) that show that obesity is not associated with dementia. Also, our results for limitation in daily activities and difficulties in medication intake are consistent with previous findings (Giebel et al., 2014; 2017).

Concerning medication intake, as expected, the percentage of individuals up to 74 years that ingest 5 or more pills a day increases within the age range. Such trend seems to stabilize in the subsequent age ranges. This results are in agreement with other studies that report high medication intake by dementia individuals (Marques, Rocha, Pinto, Sousa & Figueiredo, 2015).

The percentage of individuals with one or more Limitations in Activities of Daily Living (LADL) increases with age progression, and the presence of several LADL in dementia has been shown before (Giebel, Sutcliffe & Challis, 2015; Wilms, 2000). The number of chronic diseases and life quality was stable across all age ranges. Therefore, our results suggest that individuals with dementia appear to be more resilient to age progression declines due to repercussions suffered earlier related with the syndrome. This outcome was not expected but is possibly related to previous findings that suggest that LADL and other variables have a big impact on life quality of dementia subjects (Giebel et al., 2014).

In relation to depression, after age-grouping adjustments, both groups showed a drop in the proportion of individuals depressed from the ≤64 years group to the 65-74 group and then a successive growth in the next age groups, with dementia subjects always having a higher number of members depressed. Therefore, our results corroborate other studies (Snowden et al., 2015; Bennett & Thomas, 2014; Gao et al., 2013) that found that depression is highly associated with dementia. More interestingly, for dementia subjects the referred drop in depressed individuals is highly accentuated, and all the next age groups have a lower percentage of depressed individuals. This means that the age range where there are more dementia subjects depressed is the one considered as "young onset" (Alzheimer Europe, 2015; Vieira et al., 2013).

As expected, cognitive function scores revealed that dementia subjects have poorer scores for all cognitive function tests having a 2 times lower proportion of individuals that have 'Good' orientation when compared to subjects without dementia. Furthermore, individuals with dementia also shown a more impaired memory function, having a lower ability to recall learned words, especially after some time delay, which had been associated with Alzheimer's type of dementia

(Cerami, Dubois, Boccardi, Monsch, Demonet & Cappa, 2017). The same pattern is exhibited in verbal fluency scores, revealing a lower ability to spontaneously point out as many animal names as possible. This data seems to follow the usual impairments from dementia which are mainly related to memory function (Hendrikse, 2017; May et al., 2016; American Psychiatric Association, 2000). Also, for both numeracy tests (percentage and subtraction calculation), as expected, dementia subjects demonstrated more difficulties than those without dementia, especially for percentage calculation, and it has been shown that dementia cases (except semantic dementia) usually exhibit impaired numeracy functions (Cappelletti, Butterworth & Kopelman, 2012). Despite all, dementia individuals seem to have some insight about their skills, since they had shown a worse self-evaluation for reading and writing skills. This might be related to lower cognitive test scores as previously shown, educational variables or depression.

For continuous variables of cognitive function evaluation (immediate and delayed recall and verbal fluency) after age-grouping adjustments, all seem to be influenced by age progression, with dementia individuals, as expected, having a poorer performance in all the tests. Not only a poorer performance in recall tasks is related to dementia but also might be predictive of it according to other studies (Boraxbekk, Lundquist, Nordin, Nyberg, Nilsson & Adolfsson, 2015) that our data corroborate. What stands out is that individuals with dementia in ≤64 years range have scores for these variables that are very close to the scores of those without dementia in 75-84 years range. The same phenomenon is noted between ranges 64-74 and ≥85 years. Our data suggest that in our sample dementia subjects have a minimum mean difference of 10 years of premature cognitive aging when compared to subjects without dementia.

Furthermore, the mean difference of cognitive scores between both groups increases in all variables from the ≤64 to the 65-74 years range and then progressively decreases. This seems to show that for older ages the mean differences in cognitive performance are diminished between both groups, probably making dementia deficits not so obvious. If we bond this last information with our depression results it seems that from ≤64 to the 65-74 years range depression proportion decreases and differences in cognitive performance increases for subjects with dementia. From 65-74 to the consequent age ranges depression proportion begins to progressively increase and differences in cognitive score performance progressively decreases for subjects with dementia. Because in Europe average retirement age is about 65 years (Finnish Centre for Pensions, 2017), this results might mean that for dementia individuals retirement might be beneficial for depression and prejudicial for cognitive abilities. This might be partly true for depression due to difficulties experienced in work from dementia and for cognitive function due to a lesser stimulant cognitive environment after retirement.

Study Contribution and Main Conclusions

The present study allows readers to understand dementia prevalence among our European sample taken from wave 6 of SHARE database, being also possible to see differences between countries. As stated before our results corroborate with most of the referred literature, being incongruent only with past BMI dementia-related guidelines and studies and with some studies of dementia proportion. That not only proportionate stronger data about dementia but also allows to explore some dementia relationships that need to be better understood. Finally, our data suggests that individuals with dementia on average have at least 10 years of premature cognitive aging, exhibiting a worse physical and mental health than people without dementia. All this data might be very important to have in consideration, not only for future research but also for dementia caregivers because it allows a better understanding of the variables associated with this syndrome.

Our study main study findings based on our sample are:

- Most of subjects with dementia have a poorer physical (e.g. higher limitations, medication intake, chronic diseases, among other factors) and mental (e.g. higher depression rates and lower cognitive scores) health when compared to subjects without dementia, exhibiting also a lower quality of life.
- Most subjects with dementia are widowed;
- Subjects with dementia have a more moderated pattern of Behavioral Risks than those without dementia;
- There were no significant associations between BMI and dementia excepting the last age-range of our sample;
- Dementia affects genders differently, especially for more advanced ages;
- Subjects with dementia retire on average 2 years earlier than those without dementia;
- Subjects with dementia have lower levels of education than those without dementia;
- Subjects with dementia have on average at least 10 years of premature cognitive aging.

Limitations and Future Suggestions

This study had some limitations. First, because our data was taken from a European database we do not completely know how homogeneous was data collection between countries. Also in that way, we found that some variables of interest for our study (e.g. work-related variables) had few respondents, making them very hard to be analyzed in a representative fashion. This could had allowed us to have a better comprehension of more specific relationships between

employment/retirement and dementia. However, our large sample makes our results stronger and we were able to point out some relationships concerning dementia that we consider relevant, especially for cognitive function, mental health and age progression. It would be pertinent for future research about dementia to assess gender differences in its progression and to analyze employment/retirement associations and relations.

Second, we consider an important limitation the fact that the variable that represent our "Dementia" group in SHARE database is arranged in a way that it involves several dementias in only one variable, not having into account the differentiation between conditions. Further analysis should be executed in future studies using dementia differentiations (e.g. Alzheimer's dementia, Vascular dementia, Dementia with Lewy bodies and others) to allow for more precise data. This should also be considered when reading our work because it represents a cluster of undifferentiated dementias that have different etiologies. However, we could obtain relevant data regarding a syndromic approach to dementia. Based on our large sample, we were able to report several associations that might be pertinent for future research and dementia care.

Our third limitation is that we did not used other waves of SHARE to analyze differences over time and so, for future research it would be important to make that analysis. Although we did not analyze those differences over time in the same individuals, we made several analysis with our sample sorted by age groups which allowed us to have a generalized comprehension of dementia progression as age increases. Also, our main purpose was to assess dementia proportions in several health fields using the most recent data possible.

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